UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS
FOREST ECONOMICS
RANGE RESEARCH

U. S. GOVERNMENT PRINTING OFFICE: 1928 J6567

BRANCH OF RESEARCH

September, 1928

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SAMPLE PLOT OBSERVATIONS

J. S. Boyce

Considerable work is being done on permanent sample plots, both on the reorganization and re-tabulation of data taken on plots in this region prior to the establishment of the station and on the establishment of new plots in even-aged stands of spruce and balsam fir. A number of points have come up in connection with this work and with work in the West by the writer years ago, which may be worthy of mention.

The value of extreme accuracy in taking and recoding the field notes cannot be too strongly emphasized. If every one engaged on such work would adopt the viewpoint that the records should be in such shape that a party coming back five or ten years later for a remeasurement can proceed without the slightest loss of time, it would help immensely.

It has been found very advantageous to divide the plot into a number of strips of a definite width and to number the trees on these strips, always beginning at the same side of the plot; for example, running from north to south on each strip, starting in a strip along one edge. The notes should state exactly where numbering began, the numbers included in each strip, and the width of the strip. This makes it possible to locate any tree in the sample plot in a minimum of time. It is also an excellent thing, when a tree has been missed and later gone back to, to show its position in relation to other numbers. For example, let us consider a sample plot containing 800 trees with 200 trees on strip 1, which ran from north to south along the west side of the plot. After the plot has been completed it is found that a tree has been missed on strip 1, and this is given the number 801. On the re-measurement it is quite easy to overlook 801 on strip 1, since that number is not expected. After the entire plot has been remeasured, 801 appears and cannot be found without looking at practically every tree on the plot. If on the sheet for 801 there is a note stating that this tree is close to 156, it can be found immediately. Those trees that have attained measurable size since the measurement five years previously and are given numbers should also carry the same note. Before starting the remeasurement on a plot, these trees can be taken out and put in their proper order, so that they can be taken in sequence. For example, 801 should be placed in the field sheets immediately following.

Nails should slant downward to the head so that the tags will hang well away from the trunk; otherwise they may get stuck against the bark with resin and at the time of remeasurement five years later be grown into the bark and difficult to release. This applies particularly to the lightweight tags made from aluminum ribbon.

In young hardwoods it is not advisable to put in nails at breast height, because a pronounced callus often results which influences subsequent diameter measurements.

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(Over)

NORTHEASTERN FOREST EXPERIMENT STATION

Boyce, Westveld and Spaulding attended the meeting of the New England Section of the Society of American Foresters at Keene, New Hampshire, September 4 and 5, where Professor Toumey showed his method of replacing gray birch and other inferior hardwoods with white pine. He has been extremely successful in the relatively few years which this forest has been under management in increasing its productive capacity.

The summer meeting of the Research Council was held at the same time. The principal discussions concerned the value of fire weather studies in New England and New York and the necessity for experimental forests to be managed by the Experiment Station in order to carry out investigations most effectively.

Boyce and Westveld spent a few days on the holdings of one of the large pulp companies in the Adirondack Mountains during the middle of the month. This company has been girdling over-mature and defective hardwoods on their lands in order to accelerate the growth of thrifty young spruce and balsam fir. This operation gives every promise of success and of more than returning its cost.

Spaulding has put in the past two months practically in the field. One trip of more than passing interest was made in company with Westveld to Newfoundland to examine certain experimental plots of slash near Millertown which were started seven years ago by the Anglo-Newfoundland Development Company, Limited. The decay is so slow that no definite conclusions could yet be drawn as to the value of lopping. Conditions are such that the top slash dries out quickly and the bottom slash water logs, both conditions greatly retarding decay.

The latter part of the month Spaulding and MacAloney made a trip to Cape Cod for the purpose of examining caged slash to exclude insects and thus separate their work from that of the fungi. It appears that the conditions favoring the work of the insects are those which also favor the activities of the fungi. The results appear to be inconclusive in showing whether insects influence the action of the fungi. These preliminary tests have shown an effective method of caging the slash.

Wheaton's resignation, effective the last of the month, put an end to the sample plot work for the season, and Donald Curtis, who has been assisting in this project, returned to Penn. State College for his senior year.

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General

Field work of the Station was considerably interrupted during this month by the return of temporary employees to the forest schools. The Station was especially fortunate in securing the services of a number of very competent young men for the summer season and finds difficulty in replacing them on their departure to resume their college work. While the field season will continue until sometime in December, the Station has been unable to replace these temporary men as completely as is desirable.

The Station regrets to announce the loss of Dr. Bernard S. Meyer who has resigned to teach in the Department of Botany, Ohio State University. Meyer regrets his inability to carry on the grazing study which he had undertaken during the past year but feels that the present opportunity to resume teaching and research in plant physiology justifies the change he has made. He becomes an "ex officio" member of the station staff.

Coville came to the Station during the latter part of the month and has been working with several members of the Station to familiarize himself with conditions in this region.

Needless to say, the extensive change of temporary personnel which may be expected as long as students are employed, very seriously disrupts the Station's plans of work. We believe that students of the forest schools can with mutual advantage to themselves and the Station, undertake a year of field experience in the course of their college studies and we hope that some of the advanced students will plan their college careers in this way.

Flood Study

The report of the relation of forests to floods in the Ohio Valley was revised, and forwarded to Washington during the month. The completion of this work took the entire time of five members of the Station during the first part of the month.

Attention is called to the discussion of the Mississippi flood situation printed in the Proceedings of the American Society of Civil Engineers during the past year. Discussion of this Symposium will be closed soon. Any attempt to demonstrate the value of forest cover as a storage medium for surface water in the Ohio Valley is seriously handicapped by the lack of conclusive studies on this subject.

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On October 21 Hanley and Coile left to continue yield study in second growth oak. Three days were spent in marking permanently the sample plots already measured in the vicinity of Ironton and in obtaining pictures of the various steps of the charcoaling process. Mr. John Silliman, dealer in charcoal, ties and mine props was interviewed concerning cordwood cutting. Beginning about January 1st he intends to cut a portion of his stand, taking out all the available ties and mine props from the trees and converting the remainder into cordwood which will be principally small stuff in the round. He expects to have about two hundred cords which he will convert to charcoal later. He is still employing open pit methods.

The party examined areas in Nicholas, Greenbrier and Fayette counties in West Virginia, securing four sample plots. Holdings of the Wilderness Lumber Company and the Meadow River Lumber Company were visited.

After extensive inquiry there has developed some prospect of obtaining additional volume measurements in Maryland, western Pennsylvania and southern Illinois.

Day and Winters completed their reexamination of charcoaled areas in southwestern Virginia. They spent nearly three months in the Valley of Virginia and covered thoroughly the area from Winchester to Abingdon. They revisited all the furnace tracts where McCarthy had previously found plots in the hope of finding stands containing a large percentage of mixed species (less than 75 per cent oak).

Both Day and Winters are convinced that other suitable stands of mixed species do not exist in Virginia in sufficient amounts to justify the expense of hunting them. This is particularly true of the older stands where it was extremely difficult to obtain plots containing the desired mixture. The chestnut is gone except in the headwaters of the Holston and New rivers; and the other principal associates of the oaks in this region, the pines and hickories, do not seem to be able to compete with the oaks in even-aged stands and are killed out gradually as the stand grows older.

During the latter part of August and early September they crossed and recrossed several times the divide between the Roanoke and tributaries of the Ohio. They were interested in observing that while the chestnut blight has cleaned everything except sprouts on the east side of the divide, it is less developed on the headwaters of the Holston and New rivers. Large areas were found, where there was apparently no infection, which abutted almost directly against the drainages on the east side where destruction was complete. It seems probable that the absence of chestnut on the comparatively high and rugged divide between the two drainages, together with the effect of the prevailing wind, has served to isolate these areas temporarily.

In addition to the yield plots, approximately 200 volume measurements were secured on hickory, pitch and scrub pines and several other species.

Woodland Grazing

The field party conducting the reconnaissance survey of woodland grazing, composed of B. S. Meyer and H. F. Morey, spent all of the month of August and the first ten days of September in Indiana. Twenty-four sample plot studies were made during this period. In addition, many general observational data were collected and many photographs were taken.

The following are some of the more interesting tentative conclusions which appeared to be justified by the first season's work:

(1) Grazing as normally practiced in the central states woodlands interferes more with the development of reproduction than with its establishment.

(2) Grazing of woodlands frequently results in a retrogressive succession in the herbaceous flora. This is due to the invasion of grazed woodlands by weed and weed-like species, which are seldom browsed, and are of practically no forage value.

(3) The moderate grazing of woodlands by hogs frequently assists in the establishment of lighter-seeded species. The rooting of hogs churns up the leaf litter and exposes the underlying soil, often resulting in almost ideal conditions for germination.

(4) There appears to be a strong possibility that grazing, especially in the lighter oak-hickory woodlands, may create a condition which conserves soil moisture by destroying the shrubby and herbaceous understories which presumably consume large amounts of water in transpiration. Final determination of this will have to await a detailed study of soil moisture conditions created by the forest cover.

(5) There appear to be certain very definite situations in which controlled grazing, intelligently applied, may be utilized as an integral part in silvicultural systems. It does not appear that grazing and timber production in the same woodland will prove to be entirely incompatable, except during the early development of the reproduction.

(6) Among the species grazed only under very heavy stocking are sweet gum and red cedar.

Day is taking over this project relinquished by Dr. Meyer.

Plantations

Bower and Gordon continued the study of older plantations in Illinois. Those in the northern part of the state were found better stocked and more suitable for the study of yield.

Kellogg went to Wooster to secure records of Ohio plantations and was accompanied by Coville, who wished to inspect the Wooster plantations. They also visited the Carr Nursery near Yellow Springs and Bryan Park, where an arboretum is to be established.

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LAKE STATES FOREST EXPERIMENT STATION

During the months of August and September, the office was still deserted by nearly the entire staff except for Kittredge who was laboring upon the completion of his two manuscripts before taking his 9-month furlough beginning October 1.

Averell is still in the field in Minnesota on the study of the effect of drainage upon timber growth in swamps. Mitchell is on his autumn phase of his study of the relation of weather to fire hazard in Wisconsin. Bates spent most of the time on his seed collections in addition to giving attention to the problems on the Superior National Forest. Mowat, Gevorkiantz, and Berg are at Ruse, where the logging of 20 acres of the experimental forest was begun early in September, and are busy marking timber, supervising brush disposal, making local volume tables of sugar maple, and determining converting factors between cords, cubic content, and board feet for bolts of different sizes. Scholz spent most of the time in Wisconsin on the study of growth after partial cutting.

Bates collected seed of Norway pine from 35 different sources throughout the Lake States region. These collections vary from a few hundred to 5,000 seed each. This seed is now being extracted from the cones; germination tests as well as their weight, size, and other individual characteristics will be determined. Next spring these different lots will be sown in the nursery of the Chippewa National Forest to produce stock. Small quantities of this stock will be planted out in permanent plantations in at least three different localities, which, however, are not yet definitely determined. Through cooperation with the Northeastern and Allegheny Experiment Stations seed collections of Norway pine are being also made in its eastern range.

It seems that Norway pine is confined to a region characterized by mean summer isotherms varying from 57° to 65° F. If the conclusions reached by the Swedish Forest Experiment Station that even one degree C. (1.8° F.) has a marked influence on the survival of Scotch pine, a range of nearly 8° F. in Norway pine should also have a marked effect upon the vigor and growth of the plantations made from seed obtained from the various climatic localities. The Swedish Experiment Station found that if seed of Scotch pine is transferred from one region to another differing by 1° C., there is a decrease of nearly 35 per cent in the survival and early vigor of the resulting plantations.

The chief sources of Norway pine seed in Minnesota lie largely in the northwestern part of the State, characterized by a mean summer isotherm of 63° F., which may be considered the optimum climatic zone. There are a number of other sources of seed of minor consequence scattered throughout the region.

The localities where planting of Norway pine is most in demand are around Cloquet, the Superior National Forest, in Minnesota; the Huron National Forest in the Lower Peninsula and the Marquette National Forest in the Upper Peninsula, in Michigan; the Trout Lake region in Wisconsin; and a few other localities.

The Cloquet region is characterized by a mean summer isotherm of about 60° F. The Superior National Forest has an isotherm varying from 57° to 60°. The Lower Peninsula of Michigan has an isotherm of 63°, while the Upper Peninsula of Michigan lies within the summer isotherm of 60°. The Trout Lake region in Wisconsin has an isotherm of 61°.

It would seem from the preliminary observations that the seed collected from the northwestern portion of Minnesota, such as the Chippewa National Forest, would be suitable for the Lower Peninsula of Michigan and the regions in Oneida and Marinette Counties of Wisconsin, but would not be suitable for Cloquet, the Superior National Forest, Trout Lake, or the Upper Peninsula of Michigan.

A preliminary conclusion is that while seed collected at Cloquet can be used on the Superior National Forest and vice versa, it is preferable, however, that the stock to be planted on the Superior National Forest should be raised from seed collected on the Superior Forest itself.

Further study should show whether the mean summer isotherm is the only controlling factor or whether there are some other factors which must be taken into account in selecting the source of seed for any locality.

The seed was collected with two objects in view: (1) To determine the effect of locality, and (2) to determine the effect of the individual characteristics of trees from which the seed was obtained. Of the 35 different sources of seed, 8 or 10 lots were collected from trees to determine the hereditary transmission of individual characteristics; the rest to determine the effect of climatic locality.

Another interesting observation was also made by Bates. Last year was generally a good seed year for Norway pine, most of the trees bearing heavily. Yet, he found individual trees of Norway pine which bore heavily last year bearing seed also this year.

Aside from Norway pine, 30 odd lots of seed of other species were collected, particularly of hard maple, black and white spruce, balsam fir, two species of oak, two hickories, black and white walnut, white ash, black cherry, and three species of birch.

The study of bird's-eye maple, as far as it went, points to environment rather than heredity as the factor responsible for the peculiar grain in the wood. Bates found, for instance, that all the maples showing the bird's-eye structure were suppressed in their early life, and he is inclined to connect this early suppression with the development of the peculiar grain of wood. This is not by any means a final conclusion as the study is merely in its inception. Further investigations will either reject or corroborate this hypothesis.

A start has been made in the study of seed of our native species, and there is no telling where this trail may lead us.

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APPALACHIAN FOREST EXPERIMENT STATION

General

Korstian attended the annual meeting of the North Carolina Forestry Association at Goldsboro, N. C., the attendance at which was considerably reduced by the floods following the tropical storm which had hit the Atlantic coast previously. A number of people started for the meeting but had to turn back and others reached Goldsboro in time for the second day's program, travelling by devious routes. Several interesting discussions developed, particularly on the handling of farm woodlands and the stabilization of forest taxation. A number of valuable contacts were made in connection with the Coastal Plain work.

Fire Damage to Forest Soils (Pf, A-1)

Hursh's soil study party spent the latter part of August and the first week in September at Berea, Ky., where a preliminary survey was made of the principal soil types on the Berea College Forest. Fires on the forest during the winter of 1927-28 made it possible to obtain data

on soil conditions that obtain through forest fires on different forest soil types. Three very different soil types are present on the Berea Forest; the shale soils at lower elevations, the limestone derived or limestone influenced soils on the upper slopes, and the sandy soils derived from coarse sandstone and conglomerate on the summits and higher elevations. Strip tallies indicate that the forest composition differs for the different soil types.

The soil profile was compared over burned and unburned areas of each of the three soil types. For the purpose, soil pits were dug at regular intervals and a profile description recorded. Soil samples were collected for laboratory study of physical structure, water-holding capacity, etc. In general it appeared that removal of the litter by fire was most complete on the sandy soils. Data as to the changes in physical structure of forest soils due to burning of the surface litter have not yet been completed.

During September the party also made observations on the Shavers Fork burn, in West Virginia. On a burn which occurred here in 1924 an average of from 12 to 18 inches of spruce hardwood litter and detritus accumulation was destroyed. The present soil has been greatly altered from the original organic mantle. Biological activity appears to have been markedly influenced. Laboratory tests of physical characteristics will be made on comparative burned and unburned samples.

Cutting Methods and Reproduction of Hardwoods (Mc-2)

The computation of the data from the extensive survey of cut-over areas, particularly the work of the past season, was started by Buell. The variables of composition, site, period since cutting, and condition have been boiled down to 52. About 300 half-acre samples are to be analyzed. The destinies of this work are uncertain. The unusually large amount of field work which confronts the Station for the fall and winter will undoubtedly delay the completion of this analysis.

The reexamination of the disengagement plots in young growth which followed the 1916 burn at Lookingglass Rock brought out interesting results. The history of this stand has been followed since 1915, about three years after heavy logging. A small plot was established by Frothingham and Young in July, 1926, six weeks after the fire. A dense growth of sumac seedlings, averaging 12 inches high, and scattered clumps of silverbell and chestnut sprouts were already present, under which there were yellow poplar seedlings about one inch high at the rate of 40 or 50 per square rod. By 1923 the sumac, silverbell, chestnut, and locust formed a dense cover about 10 or 15 feet high, under which the yellow poplar - except for a very few individuals - averaged about three feet in height. Four half-acre plots were established in 1923-4, two of which were given a release thinning, one heavy, the other light; and reproduction quadrats were established.

In September, 1928, the large plots were completely remeasured for the first time, while the numbered seedlings in the quadrats were given their third remeasurement. Tagging and descriptive records of all trees in the 2-inch class and above were started. From the uncompiled records it appears that the crown cover has more than doubled in height.

A comparison of the yellow poplar in the released and control plots is of interest.

Yellow poplar reproduction in treated and control plots

Size	Treated Plots: No. per acre: 1924	Treated Plots: No. per acre: 1928	Treated Plots: Avg. height, ft.: 1924	Treated Plots: Avg. height, ft.: 1928	Untreated control plots: No. per acre	Untreated control plots: No. per acre	Untreated control plots: Av. height, ft.	Untreated control plots: Av. height, ft.
.5 in. and less, d.b.h.	6120	3960	2.80	7.36	2760	1640	1.74	3.45
More than .5 in. d.b.h.	216	3767	-	-	148	994	-	-

The heights of the saplings .5 in. and larger, d.b.h., have not yet been averaged. The differential in height growth of the smaller yellow poplars, following the release cutting, is very noteworthy. The large decrease in number of the smaller stems is of course due in large measure to their growth into the one inch d.b.h. class. Some mortality is to be noted in the control plots and it is more than ever evident that nearly all the poplar reproduction in those plots is doomed.

A small part of one of the treated plots in which black locust is dominant was marked out as a sub-plot for separate observation of the behavior of yellow poplar reproduction under locust cover.

Chestnut Replacement (M-3)

MacKinney spent most of the month preparing reports upon permanent sample plots established during the current season and in putting the field data in shape for filing.

During the last week of the month a field party started remeasurement work on the quadrats on the Bent Creek chestnut replacement plots established last year. The results from the quadrats on the plots where the chestnut was removed in a salvage cutting -- followed by a liberation cutting of all trees of undesirable species and form -- were very marked. There has been a very large turn-over of established seedlings during the past

year, in many cases nearly 100 per cent. Also the establishment of new seedlings during the past year has been remarkable, in most cases more than 100 per cent of the total stand at the last measurement. One plot in the cove hardwood type stands out particularly in the many quadrats showing the establishment of 30 to 50 thousand yellow poplar (1928) seedlings per acre. Since this is the first remeasurement of the quadrats too much weight must not be given the results but the possibilities are very promising.

Thinnings in Yellow Poplar (Mt-2)

The Station has taken over a pair of sample plots, thinned and control, established eight years ago by State Forester J. S. Holmes in yellow poplar at Cranberry, N. C. These plots were remeasured in 1922 by McCarthy. Frothingham, Korstian, and Buell spent a day on the Company's lands -- which are a three hours drive from Asheville -- to discuss further work there. The yellow poplar stand is now about 40 to 45 years old, following a clear cutting for charcoal. It covers more than 100 acres and is the largest stand of pure or nearly pure yellow poplar second-growth yet observed in the region. The composition and density come close to being uniform over the entire area; some parts of the stand contain a slight mixture of sugar maple, walnut, hickory, beech, and yellow birch.

Under a cordial offer of cooperation by the Company, the Station is considering the extension of thinning experiments at Cranberry, which lies within the limits of the Asheville branch station and is on the main thoroughfare by which field parties travel to and from the Shenandoah valley. The Company made thinnings in a part of the stand in 1920, and proposes to continue these next year. Incidentally, the 1920 thinning removed 8 or 9 cords per acre of poplar cordwood from 15 acres, at a profit of $4 per cord. Since the owners expect to hold the land indefinitely and are anxious to cooperate with the Station, there is a splendid opportunity here to study various sorts of thinning from both the silvicultural and the economic viewpoints. The remeasurement party under J. H. Buell which will go to Cranberry next month will accordingly locate and tally the trees on a series of plots, to be marked for thinning later according to a plan based upon composition, density, and suitability for the study of a variety of thinning methods.

Another area on the Company's holdings is covered with a 17-year-old stand in which poplar is predominant. It covers 30 or 40 acres which were clear cut for saw timber and later burned over. The percentage of poplar here is a little lower than in the stand described above, and in some places it is overtopped by chestnut sprouts. Here is an interesting place to watch the response of suppressed poplar to release cutting, and in other parts of the stand the results of early thinning may be studied.

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ALLEGHENY FOREST EXPERIMENT STATION

The first half of August was devoted to the permanent sample plot work on Little Arnot and at ~~Heart's~~ Heart's Content. The latter job was nearly completed except for age counts of hardwood and white pine stumps in the adjacent cutting of Wheeler and Dusenbury; as only a few trees of these species have yet been cut the work must be postponed until fall or winter. Dr. Kelley finished his records of the minor vegetation, Plice (of Cornell) and Lutz the soils studies, and Sundling and Strauser the height measurements and studies of fire scars.

On Little Arnot 18 small quadrats (5 x 10 links) were mapped in greater detail than has been possible on the reproduction strips, where the large number of seedlings present precluded anything more than a count of those less than one foot in height. On the small quadrats the current year's seedlings as well as older seedlings of all heights were mapped, and every effort will be made to re-examine the areas several times a year. The stump age counts obtained during August and previously will cast valuable light on the applicability of selection cuttings to this type of forest.

Field work on the extensive surveys was begun in the region south of Heart's Content during August, and continued into late September. Work was concentrated on areas bearing at least some white pine. A number of plots four chains square with isolation strips of two chains were established in cut-over areas representing a variety of conditions. The plots were studied with the object of establishing the amount and kind of reproduction which follows various kinds of cuttings in stands of varying age and composition.

During the latter half of September rain and even an inch of snow (on September 26) handicapped field work. In spite of this Hough and Wood finished the work on the Arnot plots, permanently marking the areas and completing some of the lesser vegetation and reproduction quadrat studies, while Lutz completed the field work at Heart's Content and secured soil samples from the four Arnot plots.

Schnur and Lloyd spent a couple of weeks on a most intensive study of cordwood converting factors. This study was planned originally by District 7 and Mr. Day of the Day Chemical Company at Westline, Pennsylvania, and the Allegheny Forest contributed the services of two student assistants, Potter and Scholl, for a month. Nearly 1,000 trees of a good variety of species (most of them at least occasional associates of the oaks, and therefore of particular interest to us in the ME - Oaks study) and dimensions were measured for volume, and careful record kept of the amount of stacked cordwood obtained.

The same crew added seven yield plots of oak to the ME-Oaks data, all from the neighborhood of Warren. A brief tour of southern New York and northern New Jersey proved barren of plots, because of ragged or all-aged stands.

In September a number of men left. Dr. Kelley resigned on September 15 to engage in investigative work at the Boyce-Thompson Institute at Yonkers. Assistant Silviculturist Sundling left September 20 to continue his studies and research in the forest school at Penn State. Strauser, Lloyd, and Ericson, temporary assistants, left on September 1, September 10, and September 22, respectively.

The station enjoyed its first real visit from a Branch man when Mr. Clapp spent August 1-10 in the field and at headquarters. He was incautious enough to admit that the stand of virgin hemlock, beech, and other hardwoods we showed him on the east branch of Tionesta Creek was the finest (and the wettest) he had ever seen. St. Paul papers please copy.

The permanent staff attended the summer field meeting of the Allegheny Section, at Clearfield, Pa. The drive from Warren took us through interesting country, hitherto unvisited, including Cook Forest, an area of virgin pine or very old second-growth which has recently been bought and permanently preserved as public forest. From Clearfield trips were made over a rather intensively-handled state forest, the Moshannon; to the Clearfield nursery, largest of the state nurseries; and to the lands of the Clearfield Bituminous Coal Corporation, which is devoting its 25,000 acres to continuous forest production to supply its own needs. Forbes broke into his vacation in Vermont to attend the dedication of the new building of the New York State Ranger School at Wanakena, New York, the conference on ranger education which followed, and the most interesting field trips about Wanakena and the experimental and demonstration forest of the state forest school, near Warrensburg.

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SOUTHERN FOREST EXPERIMENT STATION

General

Demmon reports a most profitable visit at the California Station, followed by several days with Pearson at Flagstaff. Altogether, he spent about five weeks at these two Stations, and saw the principal centers of work of each. In California, he was particularly impressed with the seriousness of the water conservation problem, its relation to forest cover, the difficulty of obtaining a new forest growth by planting, and the preliminary work being done by the Station in developing a technique

in forest influence studies. The contact with the various men on the Station staff and the opportunity to visit their work with them in the field was very stimulating, and gave Demmon many a new viewpoint on forestry problems. In Arizona, there could be no doubt about the relation between grazing and forestry, when pointed out by such experts as Pearson, Chapline, and Cooperrider. There, also, he had an opportunity to see some of the oldest sample plot work in the Forest Service.

A. R. Trist, of the Queensland Forest Service, after visiting the New Orleans office, spent several days at each of the Branch Stations: Urania, Bogalusa - McNeill, Camp Pinchot, and Starke. He offered to send us some seeds of leguminous plants from Australia for planting on the Choctawhatchee Forest.

On September 17 and 18, a hurricane passed over Starke, blowing down as many as 25% of the trees on one of the Station's experimental plots. The wind storm was followed by a heavy rain, and altogether the rainfall for the month amounted to 14.2 inches, considerably above normal.

The entire staff at Starke helped prepare an exhibit for the State Forest Fair that was held at Waycross, Ga., Sept. 19 to 22. Vining, Harper, and Wyman attended the Fair and participated in a meeting of the Southeastern Section of the Society of American Foresters, held in connection with this Fair.

Very favorable comments were received on the Naval Stores Exhibit, for which a number of charts and panels were prepared. These included a chart showing the relation of temperature and gum yield, a chart showing the yields from narrow and wide streaks, a general chart showing the type of work carried on at Starke, two other panels of pictures illustrating projects or types of work at Starke, a set of five discs on which were placed bottles of turpentine representing the yield from trees of these sizes, a set of seven test tubes with gum in them showing the amount of gum produced by one tree for seven successive days after chipping, a log with a split face and French face on it, two logs contrasted to show good and wasteful turpentine practice, a set of seed samples, and a section showing borer damage with samples of insects.

Protection, Fire

Barnett and Righter, after returning from Urania, spent the major part of the month at New Orleans analyzing the data and writing a progress report on the Urania fire plots, based on the first five-year remeasurements.

Lentz and Putnam, on a field trip in central Louisiana, observed that nearly 15% of the total volume of the trees cut on a hardwood opera-

tion was lost because of butt rot which entered through fire injuries. The loss in quality was even greater than indicated by the volume reduction. The entire loss could be attributed to the effects of two fires that occurred in 1916 and 1924.

Measurements

Barret and Righter devoted considerable time to the preparation of a report on "Accelerated Growth Studies of Longleaf Pine," the preliminary manuscript of which was completed during the month.

Naval Stores

The heavy rains during September interfered seriously with the work at Starke. At the Sampson Lake plots, the water was still high at the end of the month, and chipping had to be discontinued on a number of trees until the water recedes.

At both the Kingsley and Sampson Lake plots, a number of trees were blown down by the recent storm. These trees were mostly those that had been chipped most heavily during the past five years.

Ecology

Pessin started a preliminary experiment to work out a technique for determining the water requirement of longleaf pine at Camp Pinchot, Fla. This work, after once well under way, will be turned over to Gemmer for observation and treatment. The method of the experiment is rather simple at the start, and may be modified as the work progresses. The main object of the experiment is to determine what moisture content of the soil is detrimental or beneficial to the seedling under the climatic conditions and in the Norfolk sand type of soil prevalent on the Choctawhatchee Forest.

Pessin collected a total of 190 different species of woody and herbaceous plants occurring in the vicinity of Camp Pinchot, Fla.

Hardwood Investigations

Lentz, Putnam, and Lindgren visited a number of hardwood operations in the southeastern section of Louisiana. Putnam and Lindgren visited a number of mills in central and western Louisiana and in east Texas. The hardwood forests in the bottomlands of Sabine River were also examined. Many of the mills visited will be forced to shut down within a few years because of the depletion of virgin timber.

Forest Pathology

Lindgren visited a number of hardwood and pine mills in Louisiana and Texas in connection with a survey of the intensity and seasonal occurrence of blue stain. This condition seems to be most prevalent in the southern pines and sweet gum. Steaming and end racking are the most common measures used for the control of the stain in gum. Kiln drying and soda dipping are a common practice in controlling the stain in pines.

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CALIFORNIA FOREST EXPERIMENT STATION

General

1928 was another scorcher in California. The severity of the fire season will probably equal that of 1924. The September series of fires, extending from one end of the state to the other, resulted in over 200,000 burned-over acres in timber and watershed areas. The Station was called upon for help in southern California where six large fires were running at the same time. Kotok, Kraebel, and Dunning attended fires on the Angeles and San Bernardino.

Kotok sat in on a conference with Norcross, Show, and members of the Office of Operation on the study of transportation systems in relation to fire control. These studies will tie in very nicely with control studies being carried on by Show and Kotok from their statistical material.

Hill, in preparing for District Ranger School, is having to handle the fundamental science portion usually covered by Dr. Meinecke, now in Europe.

Management Studies

Most of Dunning's time during the early part of the month was devoted to the natural reproduction studies on the Stanislaus Center. Specially screened plots set out in 1927 showed that only 22 seeds germinated and survived out of 2400 seeds sown. Losses are attributed almost entirely to rodents that had burrowed under the edges of the wire and their taking all of the seeds. To prevent a repetition of this loss the screens were extended below the ground.

Horn, our Biological Survey representative, spent some time with Dunning on this area, determining the kind of rodents that were causing the damage and working out methods for their control, so that the experiments can be carried out as originally planned. A 10-chain reproduction strip was permanently staked out and mapped in the sugar pine - white fir area devasted by high lead logging. Seeds of sugar pine, western yellow pine, and white fir were placed in the open and under wire cones at 1-chain intervals beside the strip to check against losses from rodents on the plot.

Horn will continue his studies on the fluctuation of rodent population as affected by cutting.

Siggins is receiving seed from the various stations for his experiment on flight of seeds.

Cover Type

Two mapping crews have been working in the North Coast ranges during the month. The low quality of the Army Tactical maps made it necessary to defer this work and transfer all crews to the South Coast ranges where excellent U. S. Geological Survey sheets are available. San Mateo County has been typed and the crews are moving southward into Santa Cruz and Santa Clara counties. As soon as the rainy season starts, the State Forester will turn over some of his rangers to assist in this work. Areas that have poor maps can only be handled by securing better maps at a later date.

The California Economic Research Council, through the California Development Association, are making a start to secure adequate base maps for these poorly mapped areas.

Forest Influence and Water Cycle Studies

Kraebel has spent the better part of the month at Devil Canyon preparing for the winter season. Some new ecological plots will be established in the recently burned out Cable Canyon. Nursery and planting experiments for the coming year were reviewed with Weaver. Kraebel has practically completed the calculations of the amount of detritus which came off of the Barranca Burn.

Data on the water cycle and erosion studies are being worked up. It proved necessary to plot isohyetal lines on the basis of the readings of the nine rain gages. The catch of the gages for natural rain checked closely, but wind interferred with the distribution of artificial rain to a sufficient degree to require the use of isohyetal zones and a planimeter to determine the total fall on each tank.

Plans are under way for the installation of additional run-off seepage tanks of larger size, in which vegetation is to be introduced for studies in transpiration, run-off, and seepage. This project is to be cooperative with the Division of Forestry of the University of California.

Surficial Run-Off and Erosion Studies. Arrangements were perfected on two trips to southern California for the installation of a surficial run-off and erosion set of two pairs of plots in duplicate, cooperatively with the Flood Control District of Los Angeles County through the Hydrographic Department. The cooperative set-up has been located and staked out in San Dimas Canyon near the Flood Control dam. Special equipment is being provided for the application of artificial rain on this set-up. Such application is to be postponed until after the winter rains.

Another set-up of the surficial run-off and erosion plots is to be located in Devil Canyon watershed. Thus three set-ups, including the one at present installed near Barranca Burn, are planned for operation during the winter rainy season.

Correlation of the intensity of rainfall and rate of run-off records is in progress. It will be possible to determine the run-off coefficients for varying intensities of rain following varying durations of rainfall. The run-off coefficients are closely related to the effective erosion of surface run-off waters.

A number of problems have been encountered in the field of influences, such as the measurement of fog and cloud drip from trees, and its significance. A number of references have been reviewed. It would be appreciated by Lowdermilk if any one who has encountered references or data on this problem will send them to him.

Fire

On September 14 and 15 Siggins assisted Professor H. E. Malmsten of the University of California in some pyrometric studies in the chamise and grassy woodland types. Surface temperatures as high as 805° F. were recorded under a burning Ceanothus cuneatus bush. Under a fairly heavy accumulation of litter the temperature reached 395° F. When the points were under a light litter or grass cover the temperatures recorded were not much above normal. This information, coupled with previous experiments on temperature tolerance of seeds, may explain why we get a heavy reproduction in our brush and chaparral types after a fire has crowned fiercely over the area, apparently destroying everything in its path.

Products

Heptane. Hill made an inspection trip to the heptane experimental area, as well as the commercial heptane sale, in Harvey Valley on the Lassen Forest. Many interesting things were found to have developed from this season's work. One was pretty conclusive evidence that neither the Wernecke inverted peak face, nor the more recently proposed split face which is creating so much interest in the south, is suitable to our large and very thick-barked trees. This is because of the ending of the hack stroke against the bark, with consequent difficulty in preventing breaking out of the wood and thus the leaving of a surface which is very unfavorable to healing. Much more promising is believed to be the European modified American face in which chipping proceeds downward instead of upward and the advantages are secured of short length of resin flow (by suitable cup position) and of flow which is all over non-absorbent smoothed bark instead of over absorbent and washboarded face-wood.

This year's experience on the commercial area has also emphasized our last year's conclusions respecting the superiority of the small hack and the attached instead of the inserted apron, and the undesirability of double chipping. The 1927 faces have established excellent healing collars on all edges, including the peak where 1928 chipping did not follow, but there is no healing where inserted aprons have been withdrawn. The most serious disturbing factor in the area is the increase in infestation by Dendroctonus Jeffreyi, which this year is somewhere near twice as heavy in the tapping area as outside. Bug attack is being followed promptly by dry-face, which has now reached between 4 and 5 per cent of the total number of faces. Entomologist J. M. Miller, however, does not feel that there is danger of any real catastrophe or that the situation demands the cessation of tapping operations. It will, however, require most careful watching.

Little Used Species. A statement was made in a previous monthly report that California white fir producers were chiefly responsible for their own dilema in respect to white fir in California. When the problem is reduced to its basic elements, the factor of careless seasoning stands out so preeminently, above all other causes of prejudice, as far as local lumber users are concerned, that it seems almost absurd to dignify the situation by calling it a "problem." California consumes about four billion feet of lumber per annum, the major part of which is of the common grades used for construction purposes. Aside from the heavier construction calling for large timbers of maximum strength, this is white fir's natural field; and yet a mere 200 million feet of white fir (186,000 M feet in 1927), - but 5 per cent of the state's annual consumption - can be only partly disposed of, because the majority of buyers refuse to use the wet or otherwise ill-seasoned material which is offered. Sawmill managers, in attempting to produce white fir more and more cheaply, because they already lose money on it, have so far succeeded only in in-

creasing their net losses. In the first place more actual waste is incurred between log pond and shipping dock, due to increased haste in manufacture and seasoning, and in the second place prejudice becomes greater because of the poorer product; hence the demand decreases still further and prices take another tumble. Brundage is now preparing an article for publication in the western lumber trade journals, the main feature of which is a concise list of the specific complaints against white fir advanced by manufacturer, retailer, and consumer, followed by a discussion of the validity of the complaints, the fundamental causes of each, and the remedies for improving conditions. The remedies in most cases are so obvious, and likewise so simple, that one wonders how the present state of affairs was ever allowed to come about.

Stain Prevention Project. The first progress report on the Fungimors dipping experiments for the reduction of air seasoning stain in western yellow and sugar pine has been reviewed by Mr. Hunt of the Laboratory. He feels that a good start has been made toward a solution of the stain problem, just as much in showing the important influence exerted by factors other than treatment in a toxic solution as in the dipping itself. The lumber company at whose plant the tests were conducted wishes to continue with the work on a much larger scale this winter. Brundage is preparing a working plan which will provide for several variables not previously included, among which are the use of a more concentrated solution than that recommended by the makers of Fungimors, the leaving of dipped boards on the yard trucks in solid piles for twelve to twenty-four hours before placing on stickers so as to allow deeper penetration of the chemicals by holding in check the surficial evaporation, and the application of the solution by means of a brush or by spraying.

The Du Pont Company has developed some toxic compounds which they think may be effective in blue stain control and have offered to furnish any quantity desired for experimental use. It is probable that some of these will be tested also in comparison with Fungimors.

Entomology

During September the field work on the Modoc National Forest was completed and Person, Struble and Wagner closed up the field camp and laboratory at Buck Creek for the season.

A survey was made of the two sample plots, one at Timber Mountain and one near Brown's Well. No overwintering brood trees were found on either of the 40-acre plots, so that it seems certain that western pine beetle infestation will show a marked decline in the 1928 winter generation.

Mr. Miller spent about a week on the Modoc reviewing the experiments and assisting with the surveys. Two days were spent on studies to determine the cause of the decline in the western pine beetle infestation.

During the latter part of the month a 320-acre check area was laid out in the Buck Creek unit. All trees killed during 1927 and 1928 to date were marked and recorded. This plot will be cruised annually and used to follow the course of the infestation in the North Warner Mountains.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

The Exodus

September was marked by a general exodus which left the organization very much crippled for the winter. About the middle of the month R. H. Westveld left to take up his new duties at Michigan State College, W. H. Meyer left for Yale, and R. E. McArdle for the University of Michigan. On top of that Simson and Isaac were away on annual leave. Prior to their leaving, Westveld, Meyer and McArdle were in the office completing their notes and preparing necessary memoranda to leave their work in shape for others to carry on. Thanks to them everything has been left in the best possible condition so that there will be the minimum interruption in this season's continuing projects.

The Forester Visits Wind River

Early in the month in company with District Forester Granger, R. C. Hall of the Tax Inquiry, and Munger, Major Stuart visited Wind River and went over the major research, nursery, and administrative activities there. It had been several years since he had been in the valley and he was naturally impressed with the changes, particularly what uncontrolled fire had done.

Mt. Hebo Plantations Re-visited

With Assistant Forester Carter, Fred Ames, and J. F. Kummel, Munger spent a very interesting two days going over the plantations near Hebo on the Siuslaw National Forest. Most of the area visited was planted between 1912 and 1917. The best of the plantations are astonishingly successful, but their irregularity emphasizes how much

there is still to learn about the technic of reforestation. Above the 2000 to 2500-foot level the planted trees are so poor as practically to spell failure. The upper slopes of this Coast Range are splendid timber-producing land, but apparently the grade of stock there (which was the same as that used on the lower elevations) was not suitable for the site. A good many hundred acres therefore must be considered unsuccessful because of not using the species or proper race for the locality. This is another instance of the need for studies of heredity and the requirements of the several regional races.

"Forest Fire Torches"

The Central Railway Signal Company has just shipped us a complimentary box of a new type of fusee made particularly for use in backfiring, as its printed label indicates. It was made according to suggestions offered by several forest protectionists who had tried the standard railway fusee in firefighting or slash disposal at the instigation of this office. The new "forest fire torch" has a tin ferrule instead of the spike point, is slightly larger in diameter, therefore giving 36 per cent more volume of flame at 2000° F, and burns for over ten minutes. Manufacturing of these has just begun and they will be disposed of in boxes of 24 each, or cases of 144 torches, at $3.00 per box or $16.20 per case.

Reed College Helps

In order to get some suggestions as to the best methods of burning down snags for application in the Douglas fir snag disposal study, Munger called on the Physics Department of Reed College and got some valued pointers from Professor Knowlton and his colleague. They became so interested in the problem that they offered to make some laboratory tests, and some blocks of snag wood were furnished them for this purpose. They later plan to go to Wind River to see the actual snag burning operations.

The Portland Electric Power Co. has given us some thermit and some ignition powders to try out in this experimental snag burning.

Douglas Fir Heredity Plantations Re-examined

The triennial examinations of the 13 and 14-year-old plantations of pedigreed Douglas fir have been in progress during the month. Munger, Kolbe, and Isaac all spent part of their time on it. A striking observation from these plantations is the difference in the size of the trees,

regardless of heredity, on the different sites. On the Mt. Hood plantations, at 4000 feet, hardly a tree is over 7 feet high, while on the Siuslaw plantations the majority are between 15 and 30 feet high. In the past the plantations have always been measured purely as to total height with a pole. On the Siuslaw the trees are now getting too high for this, and this year for the first time a d.b.h. measurement was also made.

Growth Plot Established in Plantations

While on the Siuslaw, Munger and Kolbe established a one-acre permanent sample plot in a 1912 plantation as a part of the series of growth plots for the Douglas fir type. The area had 557 planted Douglas firs now alive, and in addition a few volunteer alder, willow, and cascara. None of the planted trees were dying from suppression, although the lowest limbs were dead on about half of them. This stand already has a forest appearance and the eleven-foot bracken fern is pretty well killed out; there are 145 Douglas firs over 6 inches in diameter, and the tallest run up to 46 feet.

Fire Analysis of Grays Harbor County

Most of McArdle's last days here were spent in making from the 1922-27 reports, an analysis of the fire history of Grays Harbor County, Washington, as a part of our cooperation with the Western Forestry and Conservation Association's study of the silviculture and economics of this sample area. McArdle's analysis is an exceedingly interesting sample of the scientific way of learning the fire danger, particularly the time, place and cause factors.

A Marital Union

A marital union has been effected between the Experiment Station and the District Office by the marriage of our second clerk, Miss Otelia Krogness, and Mr. Henry Hulett of Forest Management. She continues with us, while he is taking postgraduate work at the University of Michigan.

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NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

Two permanent sample plots of a new type have recently been installed in the Priest River Experimental Forest by the ecology department of the Western Office of Blister Rust Control. While these plots are intended primarily to serve the study of Ribes ecology, during the course of their installation some data were obtained on temperatures of combustion of duff, and future examinations are almost certain to provide information of value concerning forest reproduction following fire.

Nine phases of Ribes reproduction are to be observed on each of these two plots, one on a north slope, and one in a stream bottom type, both within two miles of the Priest River Branch Station buildings: 1. If stored viable Ribes seed of each native species are present in or beneath the duff of Ribes-free western white pine stands. 2. The effect of a heavy ground fire on the stored dormant seed. 3. The effect of a medium fire. 4. The effect of a light fire. 5. The effect of the removal of the duff down to mineral soil, as by logging, road, or trail construction. 6. The effect of removal of only the top duff. 7. To determine whether germination occurs annually, or only immediately after these disturbances. 8. To determine whether rodents and birds play a prominent part in the scattering of Ribes seed. 9. To study germination and survival on undisturbed check plots, both screened and unscreened.

These plots will be re-examined by the Office of Blister Rust Control three times each year, for an indeterminate period, to study Ribes growth. We will also examine them to study forest reproduction as affected by the different methods of treatment of surfaces, and effects on stored seed.

Two temporary fire-behavior plots were installed by Gisborne on the Slate Creek fire late in September. This 10,000-acre fire on the St. Joe Forest is the largest ever encountered by the Forest Service at this late season of the year in this region. The area burned over is part of the 1910 fire on the St. Joe and consisted almost entirely of large volumes of dead and down timber with a dense ground cover of brush, scattered reproduction, and some forest plantations. Although fire is not supposed to run rapidly "now that the nights are becoming so long and so cool" - water froze in camp nearly every night - this fire made several runs of one to three miles in an hour or less.

The measurements made and the fuel samples collected, indicate that in this type of fuel wind may more than offset the advantages of high humidity and low temperature, and that rain alone can raise the fuel moisture contents high enough to prevent rapid spread and great danger. Momentum of the fire, or volume of heat plus generated wind

velocity, again stood out as of great importance in controlling the most dangerous and most rapid runs. Some of the fuel volumes, topographic arrangements and fire positions which result in high momentum are recognized by field men as "bad spots," but not all of them. And the individual factors contributing to this highest degree of danger are seldom analyzed and appreciated separately. When one or more of them are overlooked then the fire often gets away, makes a big run, and necessitates the construction of several more miles of trench. When all the factors are recognized, tactics can often be changed to eliminate one or more of them. Probably the greatest number of minor runs and cases of lost trench are due, however, to the character and intelligence (?) of the average firefighter, worse than which we hope there isn't.

Weidman participated during the month in an interesting and important field conference together with District Forester Morrell, Koch of Management, Drake of the Coeur d'Alene Forest and Dr. Hubert of the Idaho School of Forestry. Three days were devoted to an examination and discussion on the ground of the silvicultural, pathological and economic aspects of the hemlock problem on the Ohio Match Company timber sale in Burnt Cabin Creek. Two situations and problems exist here with respect to the white pine-hemlock association of species.

In one case the hemlock occurs as an apparently sound and healthy understory in a main stand of almost pure western white pine. The hemlocks are about half the age of the 160-year-old white pine overwood; they are close to 30 feet tall, suppressed in growth but pointed and healthy of crown. The question is whether to leave this understory for a future cut of hemlock, or to slash and burn it with the object of getting a crop of white pine reproduction. Although there was strong argument to follow the latter practice, which has already been tried out with highly promising germination of white pine seedlings, the consensus of opinion was in favor of leaving the hemlock.

The other situation is a somewhat more common one in which the white pine, hemlock and other species in mixture are of practically the same age. In this condition the hemlock is frequently, though not always, quite defective. The question is whether to slash and burn the defective and unmerchantable hemlocks and white firs at the time of logging in order to open up the remaining stand sufficiently to permit the starting and development of white pine reproduction. It was generally agreed that in principle it was good forestry to do this where the hemlock was defective, but not where it was sound. The district Forester decided that for the present, at least, even this form of slashing would only be done where the cost did not exceed $20 an acre.

The Experiment Station has seven permanent methods-of-cutting plots dealing with various phases of the hemlock problem in the white pine type, but they are still too recently established (1926, 1927 and 1928) to give the information desired by the District Forester and Management in this case.

Haig and a crew of three assistants spent half of September on the Kaniksu and half on the Coeur d'Alene Forest, pursuing the study of old cut-over areas. He was fortunately able to find two areas logged about 15 years ago on which the white pine was removed, leaving an understory of younger hemlock such as was under discussion on the Ohio Match Sale. A special effort was made to determine the soundness of these trees and any recovery in height and diameter growth which they may have made. This was done by felling and analyses at cross sections in the tops. Word from Haig has not come in time for this report. Preliminary results which will show recovery or the lack of it in this suppressed hemlock is being awaited with a great deal of interest by ourselves and the District Officers.

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SOUTHWESTERN FOREST EXPERIMENT STATION

The ranger training camp opened August 16 and was still in session at the end of September. Two lectures have been given by Pearson, one entitled "Research in relation to administration" and the other "Forest types and climate." A day was spent with each of two groups of men going over the work of the station.

Krauch, Lexen and Martel are engaged in the third re-measurement of the series of western yellow pine cutting plots known as Mc2,S5. The 15 years which have elapsed since the plots were established have brought about marked changes in both reproduction and development of trees.

On September 2 the Director had an interesting experience climbing Navajo Mountain. This mountain lies on the Utah-Arizona line some 160 miles northeast of Flagstaff in one of the most arid sections of the country. The scanty weather records in this region indicate only about half as much precipitation as falls at the same elevations on the Colorado Plateau and the plains of south-central Arizona. To overcome this rainfall deficiency, corresponding vegetation zones on Navajo Mountain occur from 1,000 to 2,000 feet higher then in the regions farther south. Thus, the pinon-juniper type is found at elevations between 6500 and 8500 feet; the western yellow pine type between 8,500 and 9,500 feet; the Douglas fir type between 9,500 and 10,000 feet; and the Engelmann spruce type extends from about 10,000 feet to the summit at 10,400 feet. All of the stands are poorly developed and give the appearance of meeting the moisture requirements for bare existence by living in habitats of low temperature, where water consumption may be reduced at the expense of growth.

Much interest has been manifested in the outcome of the good 1927 seed crop of western yellow pine on the Coconino and Tusayan. Owing to the light and uneven distribution of summer rains, appreciable germination has occurred only in spots where local rains happened to be most timely. In many places where seedlings are fairly numerous they germinated so late in the season that their chances for living through the winter are slight.

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DISTRICT 2

Reproduction counts were completed on the Block C quadrats. Following this, the remeasurement of one acre of south-slope western yellow pine, cut over in 1923, and a north-slope plot of Douglas fir representing both a thinning in a sapling stand and a salvage cutting of mature and decadent (mostly fire-scarred) trees, also in 1923, was undertaken.

Cone counts were started at the beginning of the second decade on selected trees representing an altitudinal series in the Douglas fir seed production study. The cones were collected, and the seed will be tested in order to get some data on total seed production. Although the crop in this species was quite light, it surpassed that of its associated species. Limber pine cones, especially, are not to be found; the crop being the poorest the writer recalls seeing in the Pikes Peak region. It has been reported that blue spruce bore prolifically this season, and this information was verified by Planting Assistant Schrader.

The fall counts in the Engelmann spruce study revealed the fact that the cones of this species had not only ripened and were shedding their seed, but that the squirrels had collected cones from the experimental area to the extent that no reliable counts could be made.

Roeser and Supervisor Higgins of the Nebraska Forest made the circuit of the selected "Nebraska" seed trees which were located at random in 1926 in the sand hills and pine ridge region of Nebraska, South Dakota, and Wyoming. Good seed crops were borne by most of the trees in the western end of the circuit, but east of Chadron, Nebraska, the crop was largely a failure. The cone crop around Crawford, Chadron, and Lusk had been scouted by Roeser in June, and it was interesting to note that a large percentage of cones reported as fertile in the spring were found dead at the time of collecting. This loss is probably due to weevil activity. In the case of some trees with small crops, all cones were "blighted" and no seed is forthcoming. This condition checks with observations made at Fre-

mont in the western yellow pine flower and cone production study. It is estimated that not over 25% of the second year cones reached maturity on the experimental area, and the ratio of mature cones to flowers which are believed to have been fertilized is indeed small. As previously pointed out, the effect of climate on western yellow pine seed production may be a secondary one, although it is barely possible that it may in some way directly influence the activity of the cone weevil.

About 200 pounds of green cones were obtained from nineteen of the special "Nebraska" seed trees. Included in this number, were the seed trees which had been nominated because of pronounced peridermium immunity. The cones were shipped to Fremont, where the seed will be extracted and shipped to Halsey in the spring. As nearly as could be determined this fall, an even larger and more widely distributed seed crop may be expected next year.

Returning to Fremont, Roeser proceeded with the annual fall cone count in the western yellow pine production study previously referred to. The cone crop collected was very small.

A start was made in remeasuring the four original Douglas fir cutting methods plots at Fremont. These are one of the oldest series of sample plots in the District, having been established in 1916. The work will be extended to get some information on the rapidity of growth and mortality in the heavy aspen stand which has completely occupied the clear cut plot.

Among our prominent visitors during the month was Dr. Robert A. Milliken, who arrived unheralded on Mt. Manitou to complete a set of observations in an altitudinal series on the penetration of cosmic rays. He checked his elevation for the local observations at the Fremont Station and incidently received some information on the aims and character of forest research.

This is the closing up month at Fremont. The Mc-161 (Douglas fir cutting methods) remeasurements will be completed, as will also the mapping and marking of Plot A-25 in the badly mistletoed western yellow pine stand within the demonstration forest. A few days will be required to make fall counts of recently established plantations, but the bulk of the older plantations are not in line for reexamination this fall.

A surveyor is expected from the District office about the middle of the month to assist in an attempt to complete the survey and blocking out of the demonstration forest. This work has been "hanging fire" for a good many years, and it is hoped that the weather will continue good and not interfere with plans to push the work to completion.

At the end of the month most of the type study observations across a valley transect will be discontinued for the season. Some work also remains to be done with the transpiration series in the greenhouse.

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OFFICE OF FOREST PRODUCTS - District One

Logging and Milling Studies

Field work was completed on the second study undertaken in this District to determine the quality of products, production costs and profit or loss on trees of different sizes in the western yellow pine type. This study was carried on in cooperation with the Anaconda Copper Mining Company of Bonner, Montana, by Bradner and Anderson of the Products Office and District Logging Engineer Neff. The plan of work was practically identical with that followed in the initial study as described in the July report.

Logging output and tree measurement data were obtained for trees from 13" to 48" d.b.h. at the George Harper logging operation on the west side of the Bitterroot Valley, near Darby, where trees varying from 160 to 610 years old were found on the same area. All skidding was done in tree lengths by caterpillar tractor. When the trees were bucked into logs at the landing each log was numbered with the tree number and log position in the tree so that a complete study of individual trees could be made at the sawmill.

With the exception of a half day's run at the Bonner mill the logs were put through the Western Lumber Company mill at Hilltown, Montana, which the Anaconda Copper Mining Company purchased a few weeks ago. Complete cost data were obtained from stump to green chain on the individual trees included in this study, for a total cut of about 150 M feet b.m.

Wood Preservation

Field studies relating to the treatment and durability of Rocky Mountain tie species were begun in this District by J. D. MacLean and R. M. Wirka of the Forest Products Laboratory on September 5.

Mr. MacLean visited the pressure treating plants to collect data on the treating and seasoning of various woods, while Mr. Wirka was especially concerned with the durability and service record part of this study.

Inspections were made by Wirka and Whitney to determine the condition of western hemlock, western larch, Douglas fir, white fir and lodgepole pine ties in Northern Pacific Test Tracks west of Missoula, where these woods have been in use for many years. Joint inspections also were made of western red cedar posts at the National Bison Range and of lodgepole pine poles in two telephone lines on the Beaverhead Forest.

Utilization Studies

Whitney spent several days in the Butte Mining District in making an investigation of the present market situation with special reference to the requirements of the various companies' sources of supply and kinds of material now being used. Considerable information was collected by interviewing the purchasing agents of the principal consuming companies and by talking with the timber contractors who supply material for this market.

Another investigation was made at the retail lumber yards in Bozeman where a considerable quantity of lodgepole pine lumber manufactured by small mills in the Gallatin Forest is being sold. Some information was also collected at the Gallatin Forest Office in connection with the lodgepole studies.

Lumber Prices and Movement

Av. Mill-Run Prices	Annual 1926	Annual 1927	First Q. 1928	Second Q. 1928	August 1928
Idaho White Pine	$35.86	$30.17	$30.20	$31.00	$31.00
Western Yellow Pine	25.17	24.19	26.55	25.52	25.04
Larch-Fir	18.19	16.38	17.60	18.23	19.01
White Fir	17.41	16.80	17.89	17.35	18.53
Spruce	23.39	25.67	24.35	21.21	23.58

Shipment and Cut	1927	1928
Shipment	144,089	173,103
Cut	162,070	166,640

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OFFICE OF FOREST PRODUCTS - District Six

Western Yellow Pine Milling and Logging Study

The milling phase started at the plant of the Shevlin-Hixon Company, Bend, Oregon. Some time necessarily was lost in moving from one band saw to another, and the study of the gang saw took more time than was anticipated. This, together with the fact that more logs (3100) were studied than originally was planned carried the work into the fourth week when the set-up provided for completing the mill job in two weeks. Other than this, the work progressed without a hitch, with the cooperating company extending splendid help.

At the completion of the mill job, Spelman again took up the logging phase, with the assistance of Hodgson and Johnson, the plan being to finish the work early in November.

Douglas Fir Air-seasoning Study

The report referred to last month was submitted to The Timberman for publication; 500 reprints will be received.

General Survey of Wood Waste in Logging Camps of the Douglas Fir Region

Mr. Hodgson was able to make some progress on his report dealing with this study; in fact, it is anticipated that it will shortly be in shape for submission to the Forester.

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Lumber Census

District 1 closed its canvass on August 3 and sent in all of the final returns. District 2 transmitted its last schedule on August 13. District 5 transmitted all but a few important delinquent schedules early in the month. A large statistical error was discovered in the latter which was corrected in time to prevent a serious error in the proposed preliminary statement.

The California office complains of the difficulty of securing returns on the revised schedule for lumber and timber products. This is apparently too complicated to be understood by a certain class of operators, and they will need simplification before the canvass of 1929.

Lumber Distribution

During the month Pierson overhauled our entire record of lumber consumption and prepared a new series of consumption tables, one for each of the years in which this study has been carried, ending with a column showing per capita consumption by States and regions. There is also a table for all years combining only the columns of per capita consumption. Numerous changes in per capita consumption were found necessary on account of the revised population figures for many of the years in the middle part of the present decade. Preliminary plottings of the consumption record by regions seem to indicate that per capita consumption has been higher in the Pacific and Rocky Mountain regions than in any of those farther East. The only regions where per capita consumption is definitely increasing at this period are Pacific North and Southern Pine.

Canadian Returns

The Dominion Bureau of Statistics has issued an excellent preliminary bulletin on 1927 pulpwood consumption in Canada. The Canadian Bureau is to be congratulated on the early date at which this preliminary information was compiled, especially in view of the completeness of the tables and text.

Philippine Expert Examines U. S. Statistics

Senor Celcilio Maneja, special attorney of the Philippine Bureau of Forestry, spent several months in the United States a considerable portion of which was at the Yale Forest School. His particular mission was

to gather information designed to improve the office practices of the Philippine Bureau of Forestry. His visit to Research was concerned mainly with his desire to understand our methods of handling inquiries by the census methods and the compilation of returns, as well as to secure a complete set of the latest forest statistics of the United States. He has compiled a very extensive manuscript book as a record of the information he has gathered for presentation to his superior officers. Senor Maneja was given all of the information for which he inquired and a considerable additional amount suggested by the aid of his questions, and was also introduced at the Bureau of the Census where he secured a full set of the forest questionnaires used in the United States and was able to observe the operation of the special statistical machinery used by the Census Bureau.

Flood Maps Under Way

During the entire month from one to three draftsmen were at work preparing a revised series of maps from the data submitted last year in reference to the flood situation on the Mississippi drainage basin. The new report, under Mr. Munn's direction, will be much more extensive and voluminous than the condensed report prepared last year, as it will include the available detailed information by major and minor watersheds. It has not been possible to foresee the exact demands which the various authors working in the field will make for map material, but in order to utilize the available time as far as possible all of the different available lines of data were made up into a series of 10 maps each showing the entire Mississippi basin as a unit.

Percentage of Wooden Dwellings

Utilizing certain information made available by the Division of Housing, Department of Commerce, a table was compiled showing the percentage of wooden construction in dwellings in rural and non-rural locations in all States and regions. The rural factors were taken in part from "Timber: Mine or Crop?" and from statements accompanying the urban table of Commerce. After completion of this table certain discrepancies became obvious, and a circular letter was written to all western Districts drawing attention to the worst discrepancies, and asking them to comment upon the results as shown for the States within their Districts.

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The remaining material necessary to complete the report on this project was obtained early in May and has since been incorporated into a rough draft manuscript.

The present forest situation in Nicholas and Webster Counties, as brought out in the report, is briefly as follows:

1. Percentage Distribution of Forest Areas According to Effects of Past Treatment

	Virgin	Lightly culled	Merch. 2nd Gr.	Non-merchant.	Old field	Total
%	7	11	25	53	4	100%

2. Percentage Distribution of Forest Areas by Class of Ownership

Ownership	Per cent
Farm woodland	17
Individually owned	
(a) Small scattered tracts	31
(b) Tracts 500 acres or over	5
Lumber and coal corporations	38
Land holding corporations	9
Total forest land	100 (664,000 acres) or 86% of total land area.

The present total stand is estimated to contain nearly 3 billion board feet of timber 10 inches D.B.H. and up, or over 11 million cords of trees 4 inches D.B.H. and up. The average annual growth is roughly 63 million F.B.M. or over 160,000 cords.

The annual acreage cut in the region, based on 1927 data, is 15,000 acres; it is estimated that in the next 18 years the virgin and lightly culled timber on the large tracts and on many of the small ones will be cut out.

The purpose of this study being to formulate a constructive economic program for land use, a number of recommendations have been tentatively adopted. It is recommended that the present area of forest land be increased to at least 90 per cent of the land area through additions thereto

from land now in farms; that the area be devoted permanently to the production of forest crops, except for certain small areas which would be of greater value primarily for watershed protection and recreation. There is no reason, however, why these areas too should not grow forest products in conjunction with their main uses.

With regard to ownership, it is felt as yet that while protection and recreation forests should be publicly owned, the question of whether the other forest land would be profitable or unprofitable under private ownership is too intricate to be dealt with in this report.

As for private ownership, consolidation of the large tracts through purchase or coordination and of the farmer-owned woodland through the formation of cooperative units for the most efficient management is recommended. Only in this manner will there be any likelihood, under private ownership, of the establishment of permanent wood-using industries based on the sustained productive capacity of second growth timber.

A conference with representatives of the Bureau of Agricultural Economics and possibly the West Virginia College of Agriculture is scheduled for early November to discuss the results of this study and coordinate the material for a single publication.

Wisconsin Study

At the request of Professor Hibbard of the Wisconsin College of Agriculture, Sparhawk spent two weeks in Wisconsin helping to prepare a bulletin that is to be published by the college dealing with the land utilization program for northern Wisconsin. There appears to be a remarkable unanimity of opinion among the town and county officials, large land owners and well informed persons generally, that there is little prospect in the near future for a large expansion of agriculture and that the bulk of the land should be growing timber. The opinion seems to be fairly general that this cannot come about under private ownership except for certain areas that will produce merchantable timber crops within a comparatively short period. The northern counties now have some two and one-half million acres of delinquent land on their hands with little prospect of its redemption. The consequent lack of revenue is bringing about a critical situation in many of the towns.

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FOREST TAXATION INQUIRY

The first step in the study of taxation as related to the lumber industry of the Pacific Northwest was finished when the form questionnaires, designated Confidential Statements A and B, were mailed out to timberland owners and operators in Washington and Oregon, owning 5,000 acres or more timberland. The last of the printed matter to be enclosed with these statements was received September 7th and the mailing was mostly completed by September 12th. Additional lists of smaller owners down to 1,000 acres were used for the selected counties in Oregon. A considerable correspondence has resulted and a few completed questionnaires have been received. Consultations have been held by Hall with several of the larger owners with reference to modifications in the questionnaire suitable to their circumstances.

The county taxation studies in Oregon have been completed for the seven counties selected in so far as the collection of data is concerned, with the exception that a few days additional will be required in Clatsop and Tillamook. Hammar and Pingree have been engaged in this work for the entire month, and Herbert for a little more than the first half of the month.

The study in the state of Washington was begun a little after the middle of the month. Hall obtained a bird's eye view of parts of the southwestern counties in travelling from Portland to Tacoma by airplane. Arrangements were made through the courtesy of District 6 for Herbert and Hall to use a Forest Patrol plane for an inspection trip over the Grays Harbor County, but unfavorable weather conditions prevented. The state officials at Olympia, including those connected with the Tax Commission, State Forester's office, and State Land Commissioner's office, were interviewed in regard to plans for Washington. Herbert has spent ten days in getting the detailed study of Grays Harbor County under way, while Hall has been investigating assessment-sales ratio data collected by the Northern Pacific Railway, and other information available from different sources in Seattle.

September found the New Hampshire study getting well under way in Fremont, a town which with its neighbors supports from its forest growing lands a thriving cooperage industry and village. Logging here has been carried on selectively for some time. The logs, for the most part, are cut by farmers from their own land and trucked to the mill where a good price is paid according to the grade of the log. Land cut over by this method is quite a different brand than that usually encountered and incidentally has a much higher taxable capacity than the common garden variety.

The general tax and economic situation is, otherwise, as unique as the cutov r forest situation. Besides the thriving forest product industry, the town is well kept, economically managed, and free from debt. For example:- a town hall and auditorium have been built and

paid for in the same year, the expenditure being taken care of by the taxes. The town is satisfied with gravel and dirt roads and its school buildings are unpretentious.

While the forest tax problem is not lacking here it is relatively free from complicating economic conditions such as have usually been found wherever the problem has heretofore been studied.

As an offset to this town, an average town has already been covered and a below average town is soon to be started in both of which contributory and complicating economic conditions, other than taxation, are considerably in evidence.

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RANGE RESEARCH

Mrs. Thompson Returns to the Office

On September 15th we welcomed back to the organization as incumbent in our New Asst. Scientific Aid position (which supplants the position left vacant by Miss Gittings' retirement) Mrs. Thompson. As Miss Saunders, Mrs. Thompson really started our range herbarium in Washington, 1916-1919, she having passed a severe apprenticeship under the tutelage of Dr. Maxon and Mrs. White of the U. S. National Herbarium, whereas our mounting and herbarium work prior to 1916 was decidedly crude.

Review of Mr. Sudworth's Photographic Collection

Dayton finished his review of the dendrological photographs in the general collection of the Service. 128 photographs were accepted and 609 discarded. Most of the discards are duplicates, have no negative, are obviously inferior, or else clearly superfluous.

More about the Miles City Station

On September 20th Mr. Marsh and Dayton met by appointment Mr. Sheets, chief of the office of Animal Husbandry in the Bureau of Animal Industry, to discuss Forest Service cooperation at the new Miles City Station, Montana. Mr. Sheets is eager to have the Forest Service cooperation but the conference reached an impasse because he is not in a position to give any assistance, whereas, with its limited funds and personnel, we are not in a position to "enlarge our tent." There is not wanting, however, the opening up of other leads and it is hoped that a way will yet be found to put the Service "on the map" at Miles City.

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FORAGE INVESTIGATIONS

Plant Routine During September

Four collections, representing 80 specimens, were sent to the Bureau of Plant Industry for formal determination. 830 plants, representing 9 collections, were reported to the field, with 219 photostatic prints of economic notes. 574 mounted plants were repaired and sent to Drafting for folders.

Grass Range Extensions

Several grasses of unusual interest were reported this month. Mr. L. E. McKenzie's no. 8, Washington office no. 57364, Argostis pallens, collected on the Humboldt National Forest, is apparently the first Nevada record of this Washington-California redtop. Strange to say Elymus simplex, which ranges from Oregon to Wyoming and New Mexico, is known from the Great Basin only by two collections on the Powell National Forest, whereof Mr. Leland D. Heywood's no. H-127, Washington office no. 55859, is the second. Mr. Wilford Bentley's no. 94, Washington office no. 55881, Poa glaucifolia, marks the second Utah and first positive District 4 record for this rather little known bluegrass. All three of these specimens have been deposited, at least in part, in the U. S. National Herbarium, and none of the three species occur in Tidestrom's Flora of Utah and Nevada.

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GREAT BASIN EXPERIMENT STATION

Details and Assistants

Inspector of Grazing Thos. Lommasson of D-1 and Supervisor S. S. Stewart of the Minidoka each completed a month's detail to the Station during August. Ranger G. C. Larson of the Uinta was detailed to the Station during the period August 15 to September 13.

Miss Sylvia M. Griswold, one of Dr. Cowles' students at the University of Chicago, spent the period from August 14 to September 20 at the Station gathering material and data for work toward her doctor's degree. She has chosen to study the role of seed production in plant succession. She collected seed from 40 of the more important plants in the different successional stages in this locality and obtained data on the amount of seed produced by the different species. The seed will be tested for germination, and establishment and competition of seedlings under various conditions.

Visitors

A grazing meeting of the Rangers, Supervisors and Assistant Supervisors of the Fishlake, Manti and LaSal Forests was held at the Station on August 2, 3, and 4. District Forester Rutledge, Ernest Winkler and A. R. Standing were in attendance from the District office. Watershed protection, range utilization and the ultimate forage crop to work for were given special attention at this meeting.

Assistant Forester C. E. Rachford attended the Rangers' meeting on August 2 and 3. He also discussed various matters with the Station personnel.

Drs. C. D. Marsh and A. B. Clawson of the Poisonous Plant Experiment Station of the Bureau of Animal Industry, located at Salina, Utah, visited the Station on August 8 to obtain a quantity of Lupinus parviflorus. They are studying the poisonous properties of this species of lupine. Several sacks of additional material were gathered by the Station and shipped to Dr. Marsh the middle of August.

Drs. H. H. Bennett and H. E. Middleton of the Bureau of Chemistry and Soils spent August 11, 12, 13 and part of the 14th at the Station. They were on an extensive trip over the country to make observations on erosion. They were shown over the streamflow and erosion experiment as well as other areas where erosion has been checked and the gullies are healing over with vegetation. Tests of the erosibility of one of the local soils was made with some special equipment they have developed. These tests showed that when the equivalent of 2.6" of rainfall in 25 minutes was applied on a very dry 14 per cent slope where 1 to 2 per cent of the ground was covered with vegetation, approximately 63 per cent of the water ran off and carried with it sediment at the rate of 29.3 tons per acre. When the soil was first wetted to a depth of 3 inches by the application of the equivalent of 1.35 inches of rainfall at a rate slow enough so that there was no runoff, and the same amount of water applied later as in the first test, 76 per cent of the 2.6 inches of water ran off and it carried off sediment equivalent to 35.8 tons per acre.

At the request of the Station, Dr. Bennett checked up on the classification of the soils on the runoff and erosion experimental areas.

P. J. Fair, District 5, and Asst. Supervisor Betenson of the Wasatch, spent several days in the vicinity of the Station obtaining material for a range management motion picture. They were able to obtain some excellent scenes of good range land, proper methods of herding sheep and some close-ups of technical phases to go into the picture.

Messrs. H. E. Williams of Denver, Colorado, S. Aldous of Albuquerque, New Mexico, and J. Scott Zimmerman of Salt Lake City, Utah, all of the U. S. Biological Survey, spent several days at the Station early in September looking into the rodent problem. Mr. Williams has been selected to conduct studies in methods of exterminating rodents in a district of several states including Utah. He made the trip here to become acquainted with problems in Utah and to select places for conducting his investigations.

General

Nelson has been in charge of most of the field work including handling the training details during the summer on account of the extensive absence of Forsling from the Station and the many visitors. Most of the field work was completed during September leaving various office and laboratory work for the month of October. The mapping of a number of quadrats had to be postponed until next year on account of the poor growth due to drought. Not a single day field work was interfered with by rainy weather during the summer. There has not been a drop of run-off from the two erosion and run-off areas since the flow from melting snow stopped in June. This is the first year with no summer run-off since the experiment was started in 1915.

Trips

Forsling attended the 9th Annual Uintah Basin Industrial Convention at Ft. Duschene, Utah where he gave one or two lectures each day on range management. The lectures were fairly well attended from among the 15,000 people who came to this educational convention.

The old Ft. Keogh Military Reservation and Post has been turned over to the Bureau of Animal Industry and is being converted into an experiment station. It includes approximately 50,000 acres of fairly typical Great Plains range land and about 3,000 acres of irrigated bottoms land along the Yellowstone river. Blue grama (Bouteloua gracilis), bluestem (Agropyron smithii), and buffalo grass (Bulbilis dactyloides) are the most important forage plants on the range. Tongue river forms the eastern boundary of the reservation. The Yellowstone River and two trans-continental railroads cut across the northeast corner. The headquarters of the Station at the old post is 2 miles from Miles City.

The combination of range and crop land offers an excellent opportunity for the study of all problems relating to livestock production in the Northern Great Plains. The Bureau of Animal Industry now has about 300 head of grade Hereford cattle, a band of grade Rambouillet sheep and some horses, which they expect to use as a foundation for stocking the range. Plans are being formulated for carrying on investigations with range cattle, sheep, horses, turkeys, and hogs, including all phases of production. Range investigations will be carried on in cooperation with the Forest Service. The Bureau of Plant Industry will probably cooperate in forage crop production and the Bureau of Public Roads will conduct irrigation studies. Many phases of the work are being carried on in cooperation with the Montana State Agricultural Experiment Station.

A meeting was called by E. W. Sheets, Chief of the Animal Husbandry Division, Bureau of Animal Industry, to outline a long-time program of investigations for the Stations. It was attended by animal husbandrymen

and others connected with livestock research or extension work representing all of the states west of the Missouri river except Kansas, Oklahoma, Colorado, Arizona, Utah and Washington, by representatives of several Bureaus of the Department of Agriculture, a few local stockmen or others interested in range problems, and by Assistant District Forester Glen Smith, Supervisor A. A. Simpson and C. L. Forsling of the Forest Service. Part of the time was devoted to the consideration of results of animal husbandry investigations in the Northwest and most of the rest to considering the program. The Experiment Station was "dedicated" at a public meeting and barbecue on the 23rd. Committees were appointed who drew up broad general programs for cattle, sheep, horse, hog and range management investigations and these were adopted by the meeting the last day.

During the period Sept. 9 to 18, inclusive, Forsling accompanied District Forester Rutledge, Supervisor Mains, Asst. Supervisor Potter, Ranger Varner and a representative of the Boise Woolgrowers' Association on an inspection trip to look over the watershed problems on part of the Boise River watershed on the Boise Forest. The Boise River is one of the most important watersheds in Idaho since it supplies the water for the Arrow Rock Reservoir in which irrigation water is stored for an extensive agricultural section around Boise and Nampa. This watershed is characterized by steep topography and a coarse granite soil that is easily eroded. The trip was made for the purpose of ascertaining what immediate administrative measures will be necessary for adequately protecting the watersheds against erosion and what studies are needed for determining the kind of range management to apply to obtain the best use of the forage without injuring the watershed or other values.

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JORNADA RANGE RESERVE

Range Conditions and Precipitation

No appreciable amount of rain fell during September so the range is drying rapidly although a good forage crop was produced from the August precipitation. Ample winter feed is assured.

Condition of Stock

All stock are in excellent condition; the calves especially are certainly a beautiful example of the benefits of conservative stocking. $45,00 has been offered for the Jornada calves, fall delivery.

Investigative Work

The quadrat charting is nearing completion. Only 120 of the 165 quadrats on the Reserve are being charted this year, partly due to the pressure of other work. Most of the quadrats charted to date show good height growth on all species, with only a slight increase or even a small decrease in the tuft area of black grama (B. eriopoda). However, an increased number of flower stalks per square centimeter of tuft area is being recorded which looks good for the volume of forage produced this year.

The clipping studies have done very little this year as they are in the southern section of the Reserve which made very poor growth during the season. The studies will probably be terminated for the year early in October.

Reconnaissance

On August 9, the Forester's approval for a new reconnaissance of the Reserve mesa was received. Negotiations were immediately put under way to obtain some help from the District, and on September 3 Hussey of the District Office, arrived to start the work. Control was established for a portion of the Reserve, and Hussey checked the field work of Campbell and Canfield. Canfield and temporary assistant Merrick were detailed to practically full-time work on the project and on September 17 Ranger Galt from the Lincoln National Forest arrived for a month's assignment with the party. Arrangements have been made with other forests for ranger details later in the year. Campbell will also be giving a good portion of his time to the reconnaissance as quickly as the routine summer field work is cleaned up. Canfield is chief of party and the work is now moving along in good shape under his supervision.

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THE EDITOR

Of all sad words in the editor's ken, the saddest are these:

> "This proof reading of rather old material makes the author appreciate, even better than before, many of the weaknesses of this report, including the structure of the report and the expression. It is impossible, now, however, to attempt to make the obvious improvements needed."
>
> --------it might have been!

In connection with this heartfelt, honest confession from an author it is interesting to turn to the files and uproot the apparently over-solicitous remark of one reviewer of this same report. This comment was made by a member of the Board of Review some little time back, previous to drastic revisions by the author and the worst that the office and the editors could do on two or more occasions. It reads:

> "My comment would be: Don't standardize him too much. Seems to me there are more important things to do than to melt a man's ideas down and run them into some conventional mold approved by some Board."

I can think of nothing to say right here that would not be gilding the lily and painting the rainbow. The moral seems to be either "verb. sap." or "Eventually, why not now!"

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